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Phyllophaga spreta (Horn), A Rare Species of June Beetle New to the Fauna of Virginia, North Carolina, and Pennsylvania (Coleoptera: Scarabaeidae)

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ABSTRACT

The presence of the widespread, but rarely collected June beetle, *Phyllophaga spreta* (Horn) is reported from North Carolina, Pennsylvania, and Virginia as new state records. A brief review of its distribution, identification, and natural history is presented, along with possible reasons for its apparent rarity and suggestions for future survey work.

Key words: Alabama, Breaks Interstate Park, Bull Run Mountains, Great Smoky Mountains National Park, Iowa, North Carolina, Pennsylvania, *Phyllophaga*, rare species, Virginia.

INTRODUCTION

Phyllophaga is a large genus of melolonthine scarabs with 860 named species in North, Central, and South America, 214 of which occur in the United States and Canada (Evans & Smith, 2007). Of these, 46 are known or suspected to occur in Virginia (Evans, unpub.). The fauna of eastern North America is well known and stable, with only three new species described since 1953 (Woodruff & Beck, 1989; Polihronakis, 2007). In the eastern United States, the larvae are sometimes serious crop, turf, and pasture pests because of their root-feeding activities, while the nocturnal feeding activities of the adults occasionally result in serious defoliation of deciduous trees and shrubs (Evans, 2002).

While conducting beetle surveys in 2008 and 2009 at Breaks Interstate Park (Dickenson County), Bull Run Mountains Natural Area Preserve (Fauquier and Prince William counties), and Powell Mountain Karst Preserve (Wise County) in Virginia, I collected fourteen specimens (9 males, 5 females) of *P. spreta* (Horn) at blacklight traps. These collections represent a NEW STATE RECORD based on the following collecting data: USA: VA, Dickenson County, Breaks Interstate Park, motor lodge, rms. 101/102, N37.28571° W82.29588°, 1-4 June 2008, A.V. Evans, UV light (1 male); USA: VA, Prince William Co., Bull Run Mountains NAP, Mountain House, N38.82433° W77.70539°, 26 May 2008, A.V. Evans, UV light (1 male, 1 female); USA: VA, Prince William Co., Bull Run Mountains NAP, vic. NW of Mountain House, N38.82621° W77.70735°, 26/27 May 2008, A.V. Evans, uv light trap (2 females); USA: VA, Prince William Co., Bull Run Mountains NAP, boardwalk, Fern Hollow Tr. W of Mountain Rd. Tr., N38.82495° W 77.7106°, 26/27 May 2008, A.V. Evans, uv light trap (2 males, 1 female); USA: VA, Wise Co., Powell Mountain Karst Preserve, Cedar Ridge, uv trap 1, ca. 1.3 km E Cracker Neck Church, N36.85483° W082.69983°, 27-29 April 2009, C.S. Hobson, A.V. Evans (1 male); USA: VA, Wise Co., Powell Mountain Karst Preserve, uv trap 2, NW of campground, ca. 1.3 km E Cracker Neck Church, N36.85527° W082.70014°, 27-29 April 2009, C.S. Hobson, A.V. Evans (1 male); USA: VA, Wise Co., Powell Mountain Karst Preserve, uv trap 3, ca. 1.3 km E Cracker Neck Church, N36.85484° W082.69856°, 27-29 April 2009, C.S. Hobson, A.V. Evans (1 male); USA: VA, Wise Co., Powell Mountain Karst Preserve, uv trap 4, ca. 1.3 km E Cracker Neck Church, N36.85480° W082.69595°, 27-29 April 2009, C.S. Hobson, A.V. Evans (1 male, 1 female). Two specimens are deposited in the Virginia

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Museum of Natural History, Martinsville, VA, while the remaining specimens are deposited in the Virginia Department of Conservation and Recreation, Division of Natural Heritage in Richmond, VA, and my personal collection.

The site northwest of Mountain House is located in the northern Piedmont physiographic region on a steep, xeric, well-drained, southwest–facing upper slope at the south end of a ridge. According to Fleming (2002), the surface substrate consists primarily of organic matter (83%), flat flaggy quartzite/muscovite schist fragments 8-25 cm in diameter (10%), non-vascular plant cover (10%), larger flat stone fragments >25 cm (5%), and decaying wood (2%). The hardwood forest is dominated by mountain or rock chestnut oak (*Quercus montana* Willdenow) and some black oak (*Q. velutina* Lamarck in J. Lamarck et al.) that show evidence of gypsy moth defoliation. Other tree and shrub species include red maple (*Acer rubrum* L.), black gum (*Nyssa sylvatica* Marsh.), black huckleberry (*Gaylussacia baccata* (Wangenh.) K. Koch), mountain laurel (*Kalmia latifolia* Linnaeus), pink azalea (*Rhododendron periclymenoides* (Michx.) Shinners), American beech (*Fagus grandifolia* Ehrhart), white oak (*Q. alba* L.), and sassafras (*Sassafras albidum* (Nutt.) Nees.). The oak stand was logged perhaps 60 or more years ago and has largely regenerated from stump sprouts. The sparsely vegetated understory consists primarily of low, ericaceous shrubs, such as Blue Ridge blueberry (*Vaccinium pallidum* Aiton) and deer berry (*V. stamineum* L.).

At the Bull Run Mountains NAP, seven additional species of *Phyllophaga* were collected in the vicinity of Mountain House on the same night, including *P. anxia* (LeC.), *P. crenulata* (Froelich), *P. ephilida* (Say), *P. fervida* (Fab.), *P. fraterna* Harris, *P. fusca* (Froelich), *P. horni* (Smith), and *P. marginalis* (Horn).

I located two males of *P. spreta* in the Casey collection at the National Museum of Natural History labeled "Penn" and without any additional information. These specimens also represent a NEW STATE RECORD.

A Google search for *P. spreta* led to the Louisiana State University's beetle database, which revealed a single male from North Carolina, also a NEW STATE RECORD. This specimen is housed in the University of Tennessee's Department of Entomology and Parasitology collection and bears the following locality information: NC, Swain Co., Great Smoky Mountains National Park, Noland Creek, 7 June 1989, light trap at 789m, D. Paulsen. It was collected as part of a study of beetles associated with northern red oak, *Quercus rubra* (P. Lambdin, pers. comm.). According to Adriean Mayor (pers. comm.), the trap was set next to the creek near some red oaks on a dirt road below the bridge, and drew in about 4,000 specimens of *Phyllophaga*, of which only one proved to be *P. spreta*.

DIAGNOSIS

Phyllophaga spreta is 16.5-19.0 mm, shining chestnut or reddish brown, without any dorsal pubescence. The antennae are 10-segmented and clypeus is not distinctly emarginated (Fig. 1). The stout lower spur of the male hind tibiae is distinctly fused at its base and only two thirds the length of the upper spur (Fig. 2), while it is articulated and nearly equal in the female (Fig. 3). The male and female genitalia are as in Figs. 4-7 and 8, respectively.

DISTRIBUTION AND SEASONALITY OF *PHYLLOPHAGA SPRETA*

Phyllophaga spreta was originally described by Horn (1887) in the genus *Lachnosterna* from two males collected in Maryland and Iowa. Images of the Maryland specimen appear on the Museum of Comparative Zoology Type Database at Harvard Entomology (http://insects.oeb.harvard.edu/MCZ/FMPro?-DB=Image.fm&-Lay=web&-Format=images.htm&Species_ID=8064&-Find). Luginbill & Painter (1953) noted that *P. spreta* is "very rare" and listed it from Alabama, Illinois, Ohio, and Wisconsin. Sanderson (1936) had previously noted its presence in Missouri. Pike et al. (1977) included all seven states in a map suggesting a range from Iowa, Wisconsin, and Maryland south to Missouri and Alabama. Therefore, it is not unexpected to find *P. spreta* in Virginia and North Carolina. Despite the aforementioned published state records from Alabama, *P. spreta* was not included

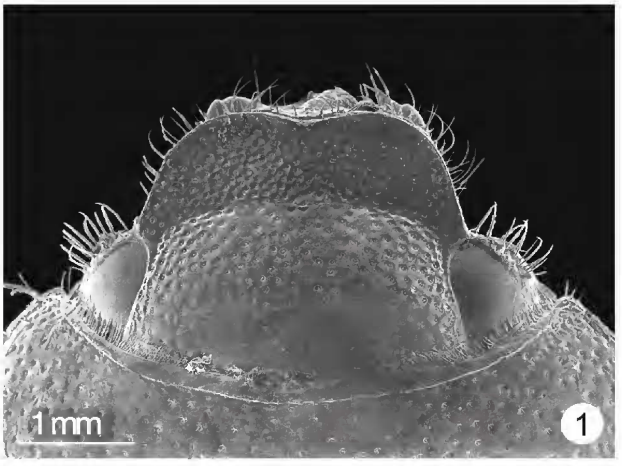
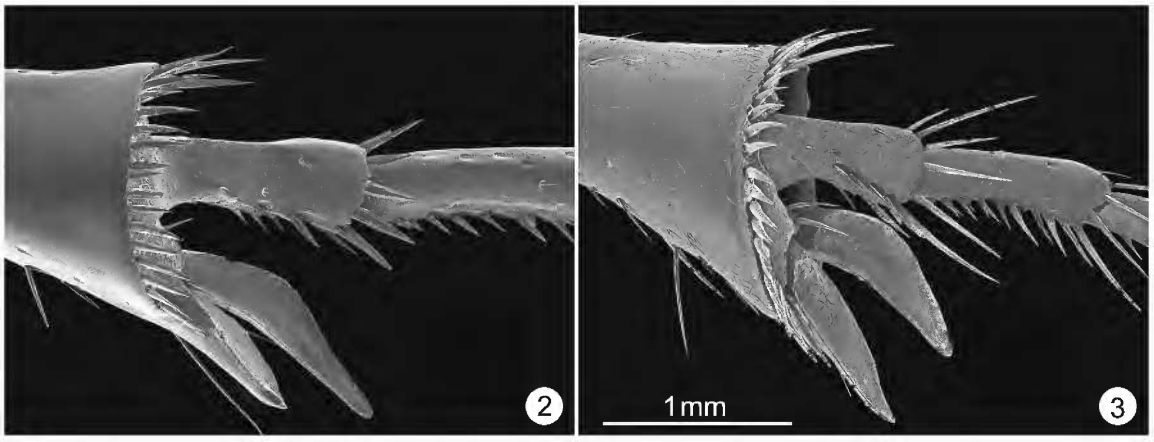
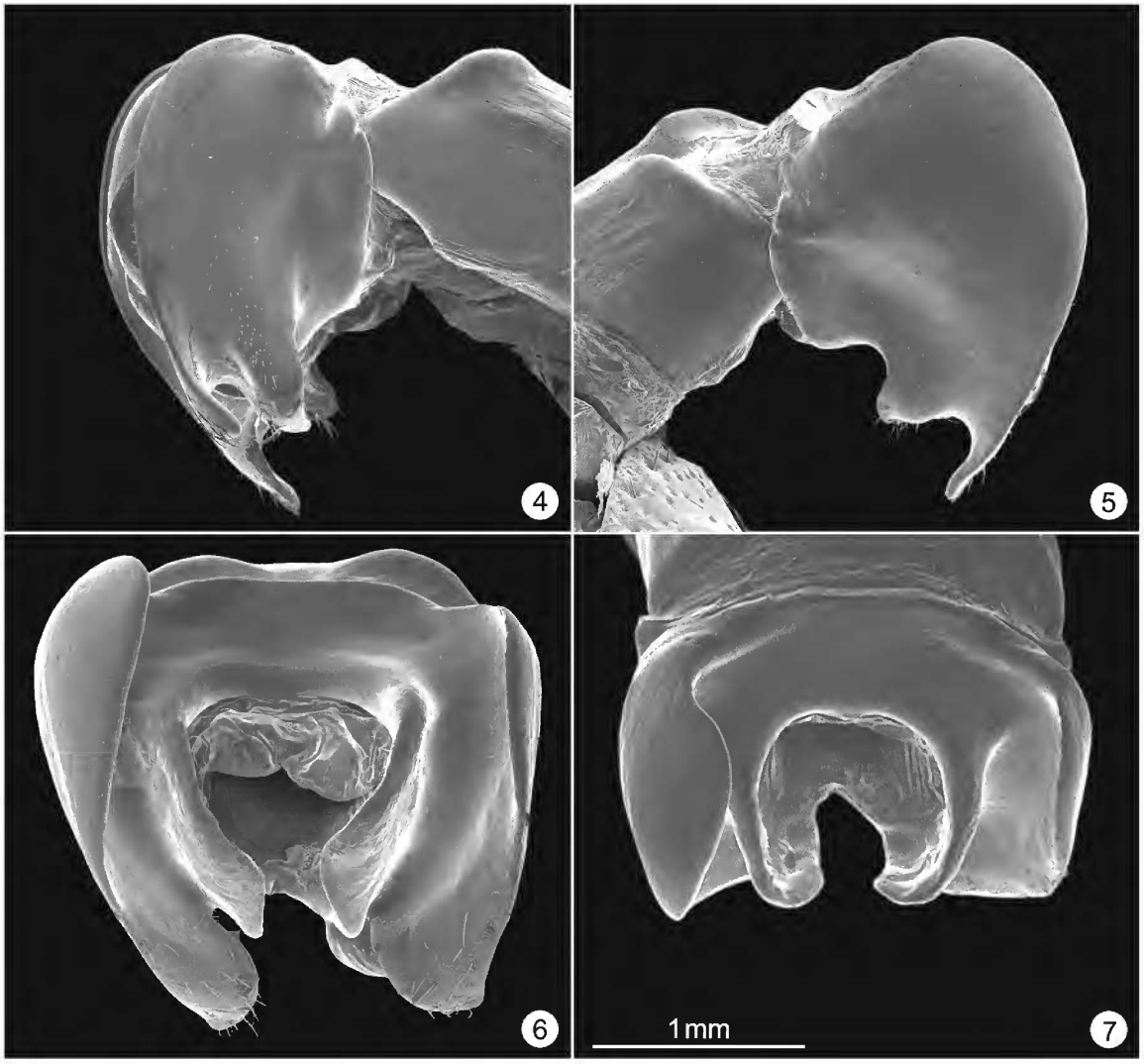


Fig. 1. *Phyllophaga spreta*, male. Head showing clypeal margin.



Figs. 2-3. *Phyllophaga spreta.* 2. Male; the stout lower spur of the hind tibiae is fused at its base and only two-thirds the length of the upper spur. 3. Female; the lower spur of the hind tibiae is articulated at the base and nearly equal in the female.



Figs. 4-7. *Phyllophaga spreta.* 4. Male, lateral view of left paramere. 5. Male, lateral view of right paramere. 6. Male, dorsal view of parameres. 7. Male, caudal view of parameres.

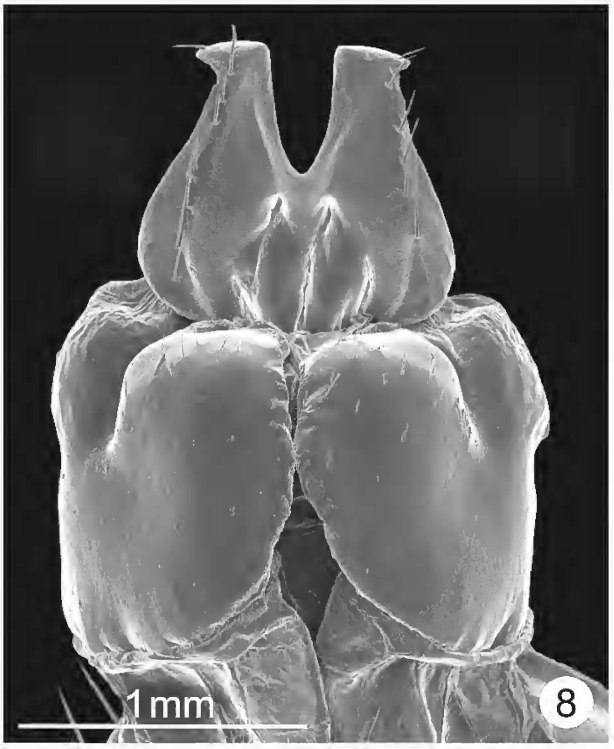


Fig. 8. *Phyllophaga spreta*, female. Ventral view of genitalia.

in a review of *Phyllophaga* in southeastern United States (Forschler & Gardner, 1990).

Most recent specimens of *P. spreta* were collected in Alabama and Iowa, all at lights. Paul Lago (pers. comm.) collected more than 75 specimens in April and May of 2005 from Jackson and Madison counties in the hills near Huntsville, Alabama. All of the specimens were collected in deciduous hardwood forests with few pines at about 1,300 feet (400 m) in elevation.

Rice & Riley (2000) found *P. spreta* in May and early June in an old growth hardwood forest in Story County, Iowa, that had not been cut in more than 100 years. The canopy cover is about 95%, and is dominated by northern red oak (M. Rice, pers. comm.). Fifteen specimens were collected in May from the same site over a three-year period (1992-94) out of 1,580 *Phyllophaga* specimens. Eight additional specimens were collected in Allamakee, Appanoose, and Pottawattamie counties, Iowa in May and early June 2004-08 from localities in upland and riparian woods, and woods at the edge of a prairie (E. Freese, D. Veal, pers. comm.). The Pottawattamie County record is only three miles from the Nebraska state line (M. Paulsen, pers. comm.), but *P. spreta* is not yet known from this state (Ratcliffe & Paulsen, 2008). This species is also known from Johnson County in eastern Iowa (Wickham, 1911).

Most of the other known specimens of *P. spreta* were collected in April or May, including specimens from Crawford County, Wisconsin (Kriska & Young, 2002), and Platte (Sanderson, 1936) and St. Louis counties, Missouri (M. Paulsen, pers. comm.).

Knaus (1899a, b) collected four specimens in June 1896 at lights at McPherson, Kansas. Curiously, this record appears to have been overlooked by subsequent workers. Knaus' collection was deposited in the Entomological Museum of the Kansas State Agricultural College (now Kansas State University) in Manhattan (Horn & Kahle, 1937). However, these specimens were not located in either the Kansas State University (G. Zolnerowich, pers. comm.) or University of Kansas (J. Cole, pers. comm.) collections. Either they were misidentified or the presence of *P. spreta* in Kansas must await confirmation by the collection of additional specimens.

ON THE RARITY OF *PHYLLOPHAGA SPRETA* AND FUTURE SURVEY WORK

Rice & Riley (2000) note that *P. spreta* is a truly rare species across most of its range. Based on previous field experiences with the spring species *Phyllophaga xerophila* Saylor (Evans, unpub.) and other nocturnally active melolonthines in the genera *Serica*, *Diplotaxis*, and *Coenonycha* in Arizona, California, and Nevada (see Evans, 1985; Evans & Smith, 1986), the rarity of *P. spreta* in collections may be due, in part, to the fact that feeding and mating adults are not readily attracted to lights and/or the adult activity period peaks before most collectors set up their light traps.

Adults of many species of *Phyllophaga* eat the leaves of a wide variety of plant species (20-50) in several families (Ratcliffe & Paulsen, 2008). Luginbill & Painter (1953) list black walnut, *Juglans nigra* L., as a host for *P. spreta*. One of the Wisconsin specimens in the NMNH collection bears a label with "Hickory" (M. Paulsen, pers. comm.). Until its feeding preferences are known, no deciduous trees or shrubs should be overlooked when searching for adults of *P. spreta*.

The Platte County specimen in the University of Kansas collection has a label indicating that it was collected from "topsoil in a grove" (J. Cole, pers. comm.). This is the beetle that was noted by Sanderson (1936) as the third known specimen of *P. spreta*. He stated that it was collected "...under dead leaves, and in the first inch or so of top soil beneath trees situated in groves." Five additional species of *Phyllophaga*, along with specimens of *Serica* and *Diplotaxis*, were also found in the same habitat.

Rice & Riley (2000) consider the genus *Phyllophaga* as a useful indicator of biodiversity and "a

benchmark for monitoring influences in future habitat alterations." This is especially true in the Midwest, where they note that several intensive surveys were conducted over the past 100 years that offer opportunities for comparative studies over time. Virginia is not so fortunate because its beetle fauna is, for the most part, poorly documented. Future beetle surveys, especially those conducted in early spring and late fall, that do not rely solely on light trapping will undoubtedly provide useful and interesting baseline data on *P. spreta* and other species thus far unknown or considered "rare" in Virginia.

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